**IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF OKLAHOMA**

STATE OF OKLAHOMA, *et al.*,	)	
	)	
Plaintiffs,	)	
	)	
v.	)	Case No. 4:05-cv-00329-GKF-PJC
	)	
TYSON FOODS, INC., *et al.*,	)	
	)	
Defendants.	)	
	)	

<u>DECLARATION OF DR. CHARLES COWAN</u>

1. My name is Charles Cowan. I am Managing Partner of Analytic Focus, LLC. I hold a PhD in mathematical statistics from the George Washington University.

2. I have been retained by the Defendants in this matter to provide testimony relating to the use of statistics and statistical models. Specifically, I was retained to review and report on the statistical analysis performed, or failure to perform statistical analysis, by Plaintiffs' experts Dr. Roger Olsen and Dr. Valerie Harwood. On December 1, 2008, my expert report was served on the Plaintiffs in this matter. That report, which I understand is attached to Defendants' Opposition to Plaintiffs' motion to exclude my testimony reflects the testimony I will provide if called to testify at trial. I incorporate that testimony here by reference.

3. I have reviewed the State of Oklahoma's Motion in Limine to Preclude Expert Testimony of Defendants' Witness Charles Cowan, Ph.D., Dkt. No. 2072 (May 18, 2009). I have also reviewed the State of Oklahoma's Response to Defendants' Motion to Exclude the Testimony of Dr. Valerie J. Harwood pursuant to *Daubert v. Merrell Pharmaceuticals*, Dkt. No. 2115 (May 26, 2009).

4. In support of their motion to exclude my testimony, Plaintiffs offer a declaration from Dr. Rick Chappell, a consultant who apparently worked with Dr. Olsen in preparing his expert report, but who was not himself disclosed as an expert witness. Specifically, it appears that Dr. Chappell was in large part responsible for generating the principal component analysis data runs that underlie Dr. Roger Olsen's testimony claiming to have identified a "poultry specific biomarker." Dr. Chappell, therefore, undertook some or all of the work that is the focus of my report. Dr. Chappell's declaration adds detail to Dr. Olsen's report and prior testimony regarding the procedures they followed in conducting their principal component analysis. I was not privy to Dr. Chappell's opinions and testimony prior to preparing my report. Nevertheless, Dr. Chappell's declaration does not change my conclusions. In fact, Dr. Chappell does not explain away any of my

criticisms regarding Dr. Olsen's analysis. In the following paragraphs, I highlight that in particular he does not explain the issues related to how data in the constructed database differs from data in the subset databases that were analyzed. These latter, Dr. Olsen's subset databases were what I analyzed (Dr. Chappell is wrong in his opinion on that), but as a researcher I should be able to start with the full database and create the subsets analyzed. I cannot because the data differs between the full dataset and the subsets.

5. Dr. Olsen's considered materials produced along with his report in this case included several relevant databases and excel files. First, Plaintiffs maintained their full dataset in a Microsoft Access database referred to as the Illinois Master database. The datasets that underlie each of Dr. Olsen's PCA runs are maintained in individual Microsoft Excel spreadsheets. There are in fact 20 versions of the Illinois Master database, each successive one adding and in some cases deleting records from prior databases. The Illinois Master databases and most of the individual run Excel spreadsheets were produced to Defendants. This included Dr. Olsen's SW3 dataset, which is named "Crosstab_Water_0427_SW_3.xls" as part of his work papers. Dr. Olsen's considered materials also included Excel files containing the PC scores resulting from his SW3 run ("Results_Water_0427_SW_3.xls") and his "scatter plot" resulting from SW3 ("PC_Plot_Water_0427_SW_3.xls").

6. In my report I criticize the manner in which Dr. Olsen compiled the datasets that underlie his PCA runs. Specifically, I explained that Dr. Olsen's SW3 run cannot be recreated fully and accurately simply by pulling data directly from any one of the many files labeled "Illinois Master Database" in the manner that Dr. Olsen describes in his Report.

7. Part of the difficulty in recreating Dr. Olsen's dataset is caused by the fact that he, without explanation or notice, often changes the names used for his samples between datasets. It is extremely unusual for a scientist to change sample names between datasets as it makes it difficult for him to reproduce his own results, yet Dr. Olsen makes such changes frequently.

For example, the following screenshot shows several samples in the Illinois Master Database.

Samplek	B_Indexky	FlowCond	COCID	SampleGrp_old	SampleGrp
118863		BFC	CDMI02507	07195500 : 10/15/2007 : 22 :	07195500:10/15/2007:SW:S:-:-
117408		BFC	348197	07195500 : 10/15/2007 : 22 :	07195500:10/15/2007:SW:S:-:-
118217		BFC		07195500 : 10/15/2007 : 22 :	07195500:10/15/2007:SW:S:-:-
113668		BFC		07195500 : 10/19/2005 : 22 :	07195500:10/19/2005:SW:S:-:-
117296		BFC		07195500 : 10/2/2006 : 22 :	07195500:10/2/2006:SW:S:-:USGS1
114651		BFC	252060	07195500 : 10/2/2006 : 22 :	07195500:10/2/2006:SW:S:-:USGS1
115718		BFC	CDMI04306	07195500 : 10/2/2006 : 22 :	07195500:10/2/2006:SW:S:-:USGS1
115719		BFC	CDMI04306	07195500 : 10/2/2006 : 22 :	07195500:10/2/2006:SW:S:-:USGS2

In the SW3 database, the first three samples, dated 10/15/2007, have been averaged and renamed "USGS-07195500:10/15/2007:SW:S:-:-." The last four samples, dated 10/2/2006 were averaged and renamed "USGS-07195500:10/2/2006:SW:S:-:-." We

2

were able to identify and relate these samples back to the Access database only by patient, manual detective work. These are but two of many examples of sample names that were modified by the removal of spaces between words, the removal or addition of prefixes or suffices, or the reordering of the components of the sample name. This makes recreating a dataset laborious and time consuming as often times one cannot simply search for the sample by its name. This is not consistent with quality data management practices.

8. The difficulty in recreating SW3 is also caused by the fact that for a number of samples, the data changes between the Illinois Master database and the SW3 file. For example, in the master database, Total Coliform data are recorded under "Paramky 68" (Parameter Key), and Enterococcus Group data are recorded under "Paramky 103." In Appendix F to his report, Dr. Olsen lists by sample group all of the data used in his SW3 run. One of those sample group names is "BS-08:8/23/2005:SW:S:-:-." When we look in Dr. Olsen's separately produced SW3 data, we find that this sample group contains data for both Coliform and Enterococcus, as shown on the following chart.

Names	COLIFORMS	CU_T	ECOLI	ENTERO
BS-08:8/23/2005:SW:S:-:-	1000	0.0005	.	0.5

However, when we take the sample group IDs and search for them in the Illinois Master database, the results indicate no data for Coliforms or Enterococcus, as shown on the following chart.

Paramaky	68	69	100	103
Names	COLIFORMS	CU_T	ECOLI	ENTERO
BS-08:8/23/2005:SW:S:-:-	No Value	0.0005		No Value

Each sample group combines data from multiple samples and tests. Sample group "BS-08:8/23/2005:SW:S:-:-." includes data associated with five different "sample keys" as shown on the following screenshot: SampleKeys 105025, 105178, 105179, 106374, and 106848

Samplek	B_Indexky	FlowCond	COCID	SampleGrp_old	SampleGrp
106729				BS-08 : 8/23/2005 : 15 :	BS-08:8/23/2005:SD:S:-:-
106373			1095	BS-08 : 8/23/2005 : 15 :	BS-08:8/23/2005:SD:S:-:-
105025		BFC	CDM001-09	BS-08 : 8/23/2005 : 22 :	BS-08:8/23/2005:SW:S:-:-
105178		BFC	05-238-0202	BS-08 : 8/23/2005 : 22 :	BS-08:8/23/2005:SW:S:-:-
105179		BFC	05-238-0202	BS-08 : 8/23/2005 : 22 :	BS-08:8/23/2005:SW:S:-:-
106374		BFC	1095	BS-08 : 8/23/2005 : 22 :	BS-08:8/23/2005:SW:S:-:-
106848		BFC	GA-2005-20-11	BS-08 : 8/23/2005 : 22 :	BS-08:8/23/2005:SW:S:-:-
117922				BS-08 : 8/24/2005 : 26 :	BS-08:8/24/2005:BN:S:-:-

In order to find the data associated with each individual sample, it is necessary to run the individual Sample Keys through the "LabResult Table" in the master database. We did so for each of the individual sample keys associated with "BS-08:8/23/2005:SW:S:-:-." We found that indeed there is no Coliform or Enterococcus data associated with any of these, as shown on the following screenshots.

3

LabResult data for Sampleky 105025. Note that there entry for any data for Paramky 68 (Total Coliform) or Paramky 103 (Enterococcus Group).

LabResu	Sampleky	Paramky	ValOp	Value_txt	Value
49633	105032	105	<	ND(1)	1
49634	105025	144	=	0.01809951403:	0.018099514
49635	105025	143	=	0.01873209920₄	0.018732099
49636	105025	149	=	0.02067760048:	0.020677600
49637	105033	94	=	82.3	82.3
49638	105033	95	=	80.3	80.3

LabResult data for Sampleky 105178. Notice there are no 68 or 103 Paramky values.

LabResu	Sampleky	Paramky	ValOp	Value_txt	Value	Fin_
51873	105179	89	<	ND(0.005)	0.005	
51874	105178	4	=	98	98	
51875	105178	8	=	6.53	6.53	
51876	105178	12	<	ND(0.01)	0.01	
51877	105178	13	<	ND(0.001)	0.001	
51878	105178	14	<	ND(0.001)	0.001	
51879	105178	15	=	0.045	0.045	
51880	105178	16	<	ND(0.001)	0.001	
51881	105178	17	<	ND(0.001)	0.001	
51882	105178	18	=	46.33	46.33	
51883	105178	19	<	ND(0.001)	0.001	
51884	105178	20	<	ND(0.001)	0.001	
51885	105178	21	=	0.001	0.001	
51886	105178	22	=	0.026	0.026	
51887	105178	23	<	ND(0.001)	0.001	
51888	105178	24	=	1.686	1.686	
51889	105178	25	=	0.005	0.005	
51890	105178	26	<	ND(0.005)	0.005	
51891	105178	27	=	0.002	0.002	
51892	105178	142	<	ND(0.025)	0.025	
51893	105178	140	=	0.055	0.055	
51894	105178	30	=	2.316	2.316	
51895	105178	31	<	ND(0.001)	0.001	
51896	105178	32	<	ND(0.001)	0.001	
51897	105178	33	=	4.023	4.023	
51898	105178	34	<	ND(0.001)	0.001	
51899	105178	35	=	0.001	0.001	
51900	105178	36	=	0.007	0.007	
51901	105178	151	<	ND(0.0002)	0.0002	
51902	105178	141	=	0.031	0.031	
51903	105178	85	=	6.14	6.14	
51904	105181	42	=	0.601	0.601	

4

LabResult data for Sampleky 105179. Notice there are no 68 or 103 Paramky values.

LabResu	Sampleky	Paramky	ValOp	Value_txt	Value	Fin
51841	105182	85	=	27.05	27.05	
51842	105179	42	=	0.134	0.134	
51843	105179	148	<	ND(0.025)	0.025	
51844	105179	58	<	ND(1)	1	
51845	105179	59	=	0.014	0.014	
51846	105179	60	<	ND(0.001)	0.001	
51847	105179	61	<	ND(0.001)	0.001	
51848	105179	62	=	0.044	0.044	
51849	105179	63	<	ND(0.001)	0.001	
51850	105179	64	<	ND(0.001)	0.001	
51851	105179	65	=	44.309	44.309	
51852	105179	66	<	ND(0.001)	0.001	
51853	105179	67	<	ND(0.001)	0.001	
51854	105179	69	<	ND(0.001)	0.001	
51855	105179	71	=	143	143	
51856	105179	72	=	0.027	0.027	
51857	105179	73	=	2.5	2.5	
51858	105179	74	<	ND(0.001)	0.001	
51859	105179	75	=	1.805	1.805	
51860	105179	76	=	0.005	0.005	
51861	105179	77	<	ND(0.0002)	0.0002	
51862	105179	78	<	ND(0.005)	0.005	
51863	105179	79	<	ND(0.001)	0.001	
51864	105179	147	<	ND(0.025)	0.025	
51865	105179	146	=	0.041	0.041	
51866	105179	81	=	2.151	2.151	
51867	105179	82	<	ND(0.001)	0.001	
51868	105179	83	<	ND(0.001)	0.001	
51869	105179	84	=	3.821	3.821	
51870	105179	86	<	ND(2)	2	
51871	105179	87	<	ND(0.001)	0.001	
51872	105179	88	<	ND(0.001)	0.001	
51873	105179	89	<	ND(0.005)	0.005	
51874	105178	4	=	98	98	

5

LabResult data for Sampleky 1068374. Notice there are no 68 or 103 Paramky values.

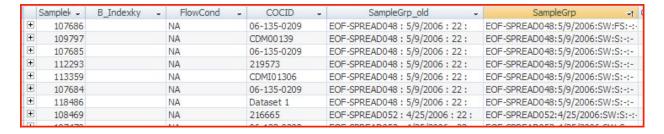| LabResu ▾	Sampleky ▾	Paramky ▾	ValOp ▾	Value_txt ▾	Value ▾	Fin
68319	106373	109 =		220	220	
68320	106374	39 =		68	68	
68321	106374	56 =		800	800	
68322	106374	98 <		ND(1)	1	
68323	106374	99 =		1000	1000	
68324	106374	102 <		ND(1)	1	
68325	106374	107 <		ND(1)	1	
68326	106374	109 =		30	30	
68327	106375	39 <		ND(0.22)	0.22	

LabResult data for Sampleky 106848. Notice there are no 68 or 103 Paramky values.

LabResu ▾	Sampleky ▾	Paramky ▾	ValOp ▾	Value_txt ▾	Value ▾	Fin_
69146	106847	95 <		ND(10)	10	
69147	106848	95 =		4.65	4.65	
69148	106848	104 <		ND(1)	1	
69149	106848	96 =		205	205	
69150	106848	105 <		ND(1)	1	
69151	106848	94 <		ND(1)	1	
69152	106849	94 <		ND(1)	1	

9. Because there is no data for Total Coliform or Enterococcus associated with any of these individual sample keys, there is no such data associated with Sample Group "BS-08:8/23/2005:SW:S:-:-." Therefore, when we attempted to recreate Dr. Olsen's SW3 dataset using the information provided in his Report, specifically the Sample Group IDs, we turned up no Total Coliform or Enterococcus data for this sample group. Yet, Dr. Olsen's separately produced SW3 database does contain such data, as shown above. Yet, we have no way of knowing where the 1000 and .5 value in the SW3 data came from.

10. Similar examples follow from another part of the data provided to us. In the screenshots that follow, we have all the sample keys that are part of one sample, and we combine the data to come up with values in our attempt to replicate SW3. We fail, however, for no discernable reason since we have uniquely identified any sample key that was part of the named sample below.

11. The samplekys from the sample table for Sample_Grp EOF-SPREAD048:5/9/2006:SW:S:-:- are 107684, 107685, 109797, 11293, 113359, and 118486.

6

	Samplek	B_Indexky	FlowCond	COCID	SampleGrp_old	SampleGrp
+	107686		NA	06-135-0209	EOF-SPREAD048 : 5/9/2006 : 22 :	EOF-SPREAD048:5/9/2006:SW:FS:-:-
+	109797		NA	CDM00139	EOF-SPREAD048 : 5/9/2006 : 22 :	EOF-SPREAD048:5/9/2006:SW:S:-:-
+	107685		NA	06-135-0209	EOF-SPREAD048 : 5/9/2006 : 22 :	EOF-SPREAD048:5/9/2006:SW:S:-:-
+	112293		NA	219573	EOF-SPREAD048 : 5/9/2006 : 22 :	EOF-SPREAD048:5/9/2006:SW:S:-:-
+	113359		NA	CDMI01306	EOF-SPREAD048 : 5/9/2006 : 22 :	EOF-SPREAD048:5/9/2006:SW:S:-:-
+	107684		NA	06-135-0209	EOF-SPREAD048 : 5/9/2006 : 22 :	EOF-SPREAD048:5/9/2006:SW:S:-:-
+	118486		NA	Dataset 1	EOF-SPREAD048 : 5/9/2006 : 22 :	EOF-SPREAD048:5/9/2006:SW:S:-:-
+	108469		NA	216665	EOF-SPREAD052 : 4/25/2006 : 22 :	EOF-SPREAD052:4/25/2006:SW:S:-:-

SW3 data.

EDA Sample	AL_T	ALKALINITY	AS_T	BA_T
EOF-SPREAD048:5/9/2006:SW:S:-:-	1.331	62	0.002	0.058
EOF-SPREAD052:4/25/2006:SW:S:-:-	3.6	74	0.003	0.088
EOF-SPREAD053B:5/4/2006:SW:S:-:-	0.784	62	0.003	0.048
EOF-SPREAD053E:4/29/2006:SW:S:-:-	1.9	160	0.039	0.106

Analytic Focus data. <u>Notice Paramky values are 59 and 4.</u>

Names	AL_T	ALKALINITY	AS_T	BA_T
Paramaky	59	4	61	62
EOF-SPREAD048:5/9/2006:SW:S:-:-	0.782	60	0.002	0.053
EOF-SPREAD052:4/25/2006:SW:S:-:-	3.6	74	0.003	0.088
EOF-SPREAD053B:5/4/2006:SW:S:-:-	0.784	62	0.003	0.048
EOF-SPREAD053E:4/29/2006:SW:S:-:-	1.9	160	0.039	0.106

LabResult for Sampleky 107684. Value for 4 is 60 and value for 59 is missing.

LabResu ▾	Sampleky ▾↑	Param ▾	Val ▾	Value_txt ▾	Value ▾	Fin
80785	107683	89	=	0.043	0.043	
80692	107684	4	=	60	60	
80693	107684	8	=	6.93	6.93	
80694	107684	12	=	0.148	0.148	
80695	107684	13	<	ND(0.001)	0.001	
80696	107684	14	=	0.002	0.002	
80697	107684	15	=	0.047	0.047	
80698	107684	16	<	ND(0.001)	0.001	
80699	107684	17	<	ND(0.001)	0.001	
80700	107684	18	=	18.5	18.5	
80701	107684	19	<	ND(0.001)	0.001	
80702	107684	20	<	ND(0.001)	0.001	
80703	107684	21	=	0.006	0.006	
80704	107684	22	=	0.313	0.313	
80705	107684	23	<	ND(0.001)	0.001	
80706	107684	24	=	2.13	2.13	
80707	107684	25	=	0.004	0.004	
80708	107684	151	<	ND(0.0002)	0.0002	
80709	107684	26	<	ND(0.005)	0.005	
80710	107684	27	=	0.001	0.001	
80711	107684	140	=	1.14	1.14	
80712	107684	30	=	15.9	15.9	
80713	107684	31	<	ND(0.001)	0.001	
80714	107684	32	<	ND(0.001)	0.001	
80715	107684	33	=	3.75	3.75	
80716	107684	34	<	ND(0.001)	0.001	
80717	107684	35	<	ND(0.01)	0.01	
80718	107684	36	=	0.007	0.007	
80719	107684	85	=	9.8	9.8	
81211	107685	5	=	0.384	0.384	

LabResult for Sampleky 107685. Value for 4 is missing and value for 59 is .782.

LabResu	Sampleky	Param	Val	Value_txt	Value	Fin
80719	107684	85	=	9.8	9.8	
81211	107685	5	=	0.384	0.384	
81212	107685	11	=	0.166	0.166	
81213	107685	42	=	0.35	0.35	
81214	107685	47	=	6.4	6.4	
81215	107685	58	=	16.9	16.9	
81216	107685	59	=	0.782	0.782	
81217	107685	60	<	ND(0.001)	0.001	
81218	107685	61	=	0.002	0.002	
81219	107685	62	=	0.053	0.053	
81220	107685	63	<	ND(0.001)	0.001	
81221	107685	64	<	ND(0.001)	0.001	
81222	107685	65	=	19.1	19.1	
81223	107685	66	<	ND(0.001)	0.001	
81224	107685	67	<	ND(0.001)	0.001	
81225	107685	69	=	0.005	0.005	
81226	107685	71	=	122	122	
81227	107685	72	=	1.05	1.05	
81228	107685	73	=	3.6	3.6	
81229	107685	74	<	ND(0.001)	0.001	
81230	107685	75	=	2.3	2.3	
81231	107685	76	=	0.045	0.045	
81232	107685	77	<	ND(0.0002)	0.0002	
81233	107685	78	<	ND(0.005)	0.005	
81234	107685	79	=	0.002	0.002	
81235	107685	146	=	1.42	1.42	
81236	107685	81	=	18.1	18.1	
81237	107685	82	<	ND(0.001)	0.001	
81238	107685	83	<	ND(0.001)	0.001	
81239	107685	84	=	3.85	3.85	
81240	107685	86	=	14	14	
81241	107685	87	<	ND(0.001)	0.001	
81242	107685	88	<	ND(0.01)	0.01	
81243	107685	89	=	0.012	0.012	
79897	107686	18	=	19.7	19.7	

LabResult for Sampleky 109796 value for 4 is missing and value for 59 is missing.

LabResu	Sampleky	Param	Val	Value_txt	Value
96844	109796	149	=	0.982	0.982
96845	109797	143	=	1.33	1.33
96846	109797	149	=	1.53	1.53
96847	109797	144	=	1.23	1.23
96848	109798	149	=	2.32	2.32

LabResult for Sampleky 112293 value for 4 is missing and value for 59 is missing.

LabResu	Sampleky	Param	Val	Value_txt	Value	Fir
117722	112292	108	<	ND(2)	2	
117723	112293	39	=	140000	140000	
117724	112293	56	<	ND(2)	2	
117725	112293	68	=	400000	400000	
117726	112293	97	<	ND(2)	2	
117727	112293	100	=	140000	140000	
117728	112293	103	=	180000	180000	
117729	112293	108	<	ND(2)	2	
117730	112294	39	=	4600	4600	

LabResult for Sampleky 113359 value for 4 is missing and value for 59 is missing.

LabResu	Sampleky	Param	Val	Value_txt	Value	Fir
120240	113358	105	<	ND(5)	5	
120241	113359	94	<	ND(5)	5	
120242	113359	95	<	ND(5)	5	
120243	113359	96	=	20.8	20.8	
120244	113359	104	<	ND(5)	5	
120245	113359	105	<	ND(5)	5	
120246	113360	94	<	ND(5)	5	

LabResult for Sampleky 118486 value for 4 is missing and value for 59 is missing.

LabResu	Sampleky	Param	Val	Value_txt	Value	Fin
155373	118485	283	<	BDL		
155374	118486	283	<	BDL		
155375	118487	283	=	966047.38549	966047	

12. There was only one value for AL_T (Paramaky 59) and one value for ALKALINITY (Paramaky 4). The values were .782 and 60, which are the values in the Analytic Focus data. The SW3 data has the values 1.331 and 62.

13. Thus, either Dr. Olsen drew his data from somewhere other than Plaintiffs produced database, or the data is filed under some other sample key or sample group that Dr. Olsen has never identified, or he simply made it up. Whatever the answer, this manner of data manipulation and transfer is not consistent with quality data management practices and renders Dr. Olsen's work very difficult, if not impossible, to reproduce.

I declare under penalty of perjury that the foregoing is true and correct.

Executed, June 5, 2009.

Charles D Cowan

Charles Cowan, Ph.D.